

Modern approach to counteraction against ecotoxicants to ensure food safety in the country

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Summary. Ecotoxicants are environmentally hazardous substances, which are capable for long-term conservation, transfer and accumulation. In concentrations exceeding the naturally occurring level, ecotoxicants have toxic effect on the health of productive animals. Ecotoxicants, which represent the greatest hazard, include mycotoxins, heavy metals, radionuclides, ractopamine etc.

Many hazards related to exposure the body to ecotoxicants can be avoided by using effective and safe agents, which have immunomodulating, detoxifying, antioxidant and other useful properties in the livestock production. One of the most effective means to offset the effects of ecotoxicants on the body is Gamavit (GM) which is broadly used both in the livestock and poultry breeding. GM is successfully used in the combination therapy of blood protozoan and helminthic invasions, to treat intoxications caused by protozoacides, radionuclides and salts of heavy metal, rodenticides etc. The drug helps to eliminate anemia and restores hematopoietic erythroid lineage with underlying congenital iron deficiency and other pathological conditions. Using GM with underlying T-2 mycotoxicosis in different animals (sheep, pigs) helps to reduce the pathogenic effects of toxin, normalize the indicators of nonspecific resistance, hematological indicators and daily live weight gain. The latter is probably attributable to the proven capability of GM to stimulate the production of growth hormone in productive animals.

Therefore, we believe that using GM (instead of synthetic growth-promoting substances) to increase the EGH production will help to avoid hazards associated with the use of ractopamine.

Modern science plays an increasing role in ensuring food safety in Russia. In particular, it is related to the development of sensitive methods of detection of substances dangerous to health in livestock products and creation of new effective and safe drugs, which help the body to use its own physiological reserves, stimulate metabolism and increase natural resistance in farm livestock.

The main objective of the agro-industrial complex is to ensure food safety in the country and supply it with high quality agricultural raw materials and food products. However, this objective is complicated by technogenic environment pollution, which poses growing hazard to human and animal health. Exposure to ecotoxins of various origin, such as environmentally hazardous substances, which can be subject for long-term conservation, transfer and accumulation, is particularly dangerous for productive animals. In concentrations exceeding the naturally occurring level, ecotoxicants have toxic effect on environment, as well as animal and bird health. Ecotoxicants which represent the greatest hazard include pesticides (including dioxins which accumulate in the fat tissues, affect immune and nervous systems, internal organs and suppress the bone-marrow hematopoiesis), heavy metals, radionuclides, mycotoxins, growth-promoting substances (especially, ractopamine) etc. [2].

Many hazards related to exposure of productive animals to ecotoxicants can be avoided by using effective and safe medicinal products, which have detoxifying, antioxidant and other useful properties in the livestock production. In our opinion, it is reasonable and economically advantageous to use Gamavit (GM), a trusted and safe Russian drug that fully corresponds to the specified conditions and is broadly used both in the livestock production and poultry breeding, for this purpose [10, 12].

GM is an effective immunomodulator, bio- and hemostimulating agent, which contains sodium nucleinate and denatured placenta extract acting as active substances. Q10 coenzyme and hexuronic acids contained in the placenta extract in combination with sodium nucleinate neutralize nitrogenous waste, prevent brain and kidney intoxication with ammonia, have therapeutic effect on liver with compromised liver functions, and activate restorative processes in liver cells. GM is successfully used in the combination therapy of blood protozoan and helminthic invasions and to treat intoxications caused by antihelmintics, ethylene glycol, ivermectin, radionuclides and salts of heavy metal, rodenticides etc. [5,7,8,14]. It has been shown that GM helps to eliminate anemia and restores hematopoietic erythroid lineage with underlying congenital iron deficiency, parasitic invasion, acute hemolytic anemia and other pathological conditions [1, 13, 14].

Among natural ecotoxicants which contaminate agricultural raw materials and food products, microfungi and mycotoxins produced by these microfungi represent almost greatest danger to human and animal health. When analyzing feeding stuff, various agricultural products etc., contamination with microfungi is determined in almost all cases, where in 20% of cases mycotoxins are found in dangerous concentrations [16]. Mycotoxins absorbed in blood affect central nervous system, cause dystrophy of liver, kidneys, cardiac muscles, disrupt metabolic processes. All types of animals, especially young stock, are susceptible. Despite that the problem has been existing for several decades, there are still no effective means of prevention and treatment of mycotoxicoses. It has been shown that the use of GM with underlying acute and subacute mycotoxicosis in different animals (sheep, pigs etc.) contributes to decreasing of

pathogenic effects of toxin and minimizes the development of degenerative-dystrophic changes in organs and tissues, which leads to faster rehabilitation of animals after intoxication and helps to normalize clinical, hematological, biochemical indicators of nonspecific resistance and daily live weight gain [15]. Therefore, it is also important to note that intoxication with T-2 mycotoxin has negative effect on the storage of meat which loses its nutritional value. However, during therapy with GM, the quality of meat improves in view of physicochemical and bacterioscopic indicators [6].

Another serious problem associated with ensuring of food safety is caused by the application of drugs stimulating the growth of cattle, pigs and poultry, specifically, ractopamine, in the livestock. The latter is used for veterinary purposes as a feed additive to increase the fleshiness of meat. In the USA, Australia, Argentina, Brazil, Canada and some other countries, ractopamine can be used as growth-promoting substance in the livestock production. In the Russian Federation and PRC, by contrast, it is prohibited to use ractopamine, and any products containing this growth-promoting substance are subject for destruction. This prohibition is caused by the risk of negative effects of residual drug content in the

livestock products on the consumer health. For example, within the period from 1998 to 2008, more than 1700 people got poisoned in the PRC after eating port containing ractopamine [3]. Moreover, according to much data, adding ractopamine in feeding stuff is unsafe for animals. Thus, in 2011-2012, more than 3800 units of cattle stock in the USA died as a result of using ractopamine and zilpaterol [3].

Hazards related to using ractopamine and similar growth-promoting substances can be avoided by introduction of safe, effective and environmentally friendly drugs stimulating the production of endogenous growth hormone (EGH) in the productive animals in the livestock. In our opinion, it is reasonable and economically advantageous to use GM, a complex preparation that helps the body to use its own physiological reserves, stimulates metabolism and also increases the production of EGH in animals, for this purpose. It has been shown that 2-2.7-fold increasing of EGH level in calves, lambs and piglets is observed after using GM, which causes significant body weight gain [4, 9, 11]. Thus, unlike synthetic EGH (rBST), ractopamine and other similar growth-promoting substances used in the livestock production, GM activates the anterior pituitary gland by increasing the secretion of own endogenous EGH.

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